

The transportation network plays a vital role in United State's socio economic development. Bridges are the critical elements in this network system. A common and widely used bridge girder type for the construction of short to medium span highway bridges in the United States is the precast prestressed box-beam (Figure 1). In addition to the corrosion of the reinforcement (Figure 2) and longitudinal cracking (Figure 3) due to extreme weather conditions, box-beam bridges encounter problems in the construction phase and under normal traffic loads. This leads to reduction in load carrying capacity and higher maintenance cost. Furthermore, due to inherited problems resulted from the structural arrangement of its components, no space between the beams remains to conduct visual inspection for critical elements like diaphragms, and the soffit of the deck slab. These short and long-term problems lead to catastrophic events such as spalling of concrete, corrosion of reinforcement, and formation of icicles (Figure 4) between the beam joints. As a result, an attractive and innovative corrosion-free replacement for the side-by-side box-beam bridge system invented to eliminate inherited problems as well as to provide enough space at the bridge underside for periodic maintenance of critical elements such as diaphragms and soffit of the deck slab. To solve this problem, an innovative and corrosion free decked bulb-T beam bridge system developed and is being evaluated. The research project is being funded from Michigan Department of Transportation and National Science Foundation. The presentation will be mainly on the development of the decked bulb-T beams, construction and their testing and performance.